FINAL EDITION

COASTAL SERVICES

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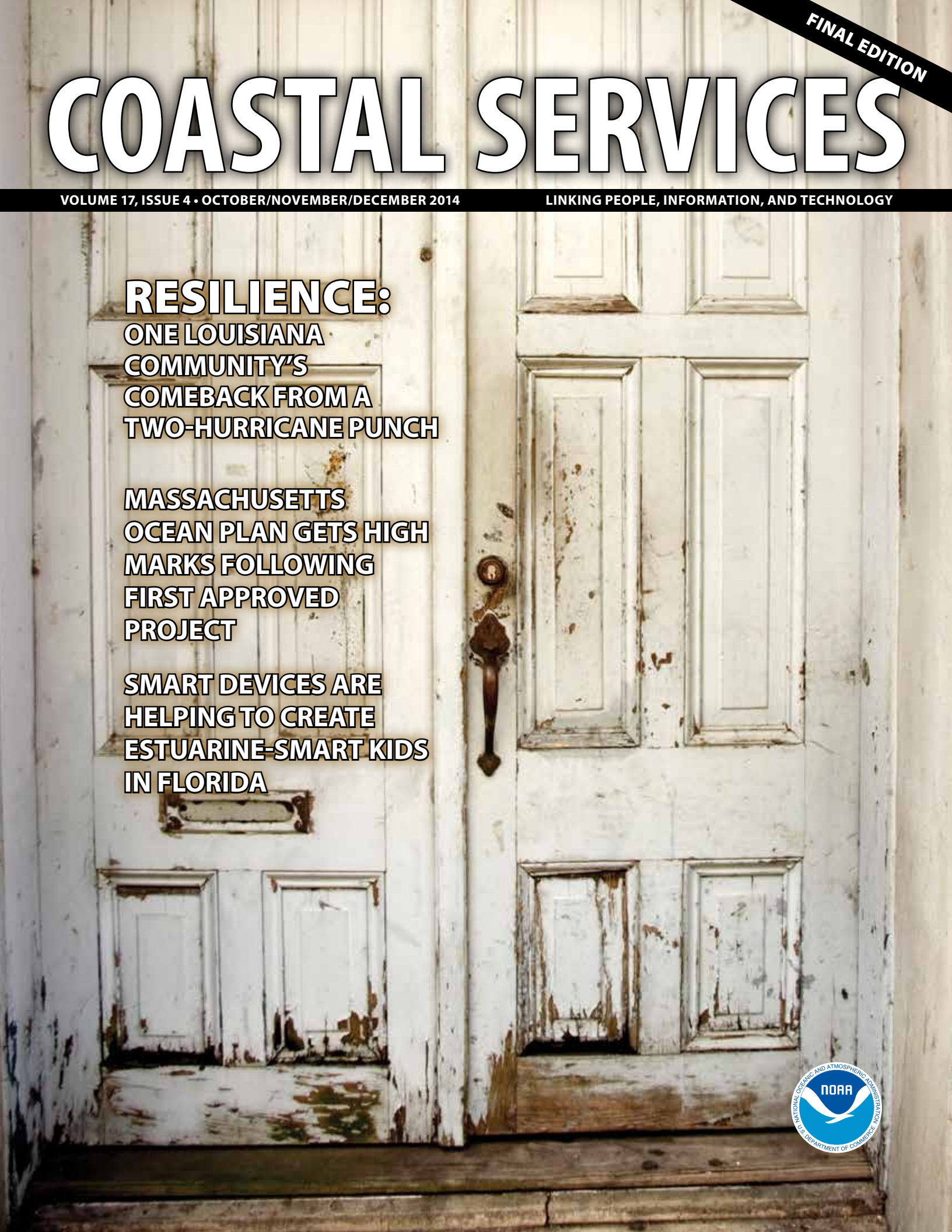

RESILIENCE: ONE LOUISIANA COMMUNITY'S COMEBACK FROM A TWO-HURRICANE PUNCH

MASSACHUSETTS OCEAN PLAN GETS HIGH MARKS FOLLOWING FIRST APPROVED PROJECT

SMART DEVICES ARE HELPING TO CREATE ESTUARINE-SMART KIDS IN FLORIDA

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LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

National Oceanic and Atmospheric Administration

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FROM THE DIRECTOR

We're excited to announce some changes—all geared to maximize the nation's coastal management efforts.

Two NOAA offices, the Coastal Services Center and the Office of Ocean and Coastal Resource Management, are combining. As of press time, the integration has not been finalized, but we feel confident this will occur in late fall and that the new name will be "Office for Coastal Management."

The basic missions will remain intact, but by coming together, new efficiencies and levels of effectiveness can be gained, such as spearheading the implementation of federal mandates, working with partners to increase coastal resilience, and providing a wide array of resources and services for the coastal management community.

The cornerstone operating principle is "partnerships," since it takes many perspectives and approaches for coastal management to be effective.

One of the changes coming out of the joined organizations is that this is the last edition of *Coastal Services* magazine. While details are still being worked out, we know that a new publication will be forthcoming focused on effectively telling coastal and ocean management success stories, especially those from our nation's coastal zone management programs, national estuarine research reserves, and Coral Reef Conservation Program.

As always, we're eager to hear from you. Let us know what you think about our efforts to expand the capacity of state and local coastal managers, find efficiencies, focus efforts, and amplify results. ❖

Jeff Payne, Acting Director

RESILIENCE

One Louisiana Community's Comeback from a Two-Hurricane Punch

Almost a decade after the record-breaking 2005 hurricane season devastated South Louisiana, many communities in the state are still struggling to recover economically and culturally. One success story is the small town of Delcambre, where its citizens boldly re-envisioned their community and have focused unwaveringly to make those dreams become a reality.

While there's still work to do, the once blue-collar and rough-around-the-edges fishing village of less than 2,000 residents is now diversifying its waterfront and economy with a yacht-attracting marina and new dockside fisherman's market. Community-based packaging and marketing campaigns for shrimp and fish are also boosting sales for fishermen by tapping into consumer demand for locally grown foods.

"The poster child for resiliency may be coastal Louisiana."

Don Davis,
Louisiana Sea Grant

Louisiana Sea Grant staff members who have facilitated, championed, and supported Delcambre's renaissance say there is much that coastal managers around the country can learn from the recovery of this rural town located about 140 miles west of New Orleans.

"The poster child for resiliency may be coastal Louisiana," says Don Davis, director emeritus of oral histories at the Louisiana Sea Grant College Program. But in nearly the same breath, he warns that other coastal communities need to realize that if they get hit by a major storm, "it's going to be a long, hard fight. It's been nine years and we're still clawing back."

DOUBLE WHAMMY

A month after the nation watched Hurricane Katrina devastate New Orleans and other communities along the Gulf of Mexico, it was the 15-foot storm surge from Hurricane Rita that almost destroyed Delcambre.

"Rita pushed a lot of water into Delcambre," says Roy Kron, director of outreach and communications for Louisiana Sea Grant. "Ninety-eight percent of the structures were damaged or flooded."

"Hell literally broke out," says Wendell Verret, who grew up in the community and is now the director for the Port of Delcambre. "For the next month or so, no one was in town, there was no business. The whole economy essentially shut down. It was just chaos."

Remembering the aftermath of the storm still chokes Verret up. "It was an absolute nightmare that was repeated house by house, block by block."

Delcambre residents had "never seen water levels like that in their little community before," says Thomas Hymel, marine extension agent for Louisiana Sea Grant. Three years later, the storm surge from Hurricane Ike flooded the town again.

"They got hit twice between the eyes," Hymel says. "It brought the community to its knees."

One difference between the storms, Davis notes, was that the houses that were rebuilt at a higher elevation

after Rita didn't flood the second time. "Ike was still devastating, but people were more aware of the risk, and there were a lot of changes made as a result."

BOLD IDEAS

After Rita, it took months for residents and businesses to dig out from the effects of the flooding. As the town slowly cleaned up, the seeds for a boldly re-envisioned Delcambre were planted.

A series of charrettes were held by the Federal Emergency Management Agency in March 2006 where city planners and architects from Florida proposed creating developments that would be elevated using soil from the excavation of canals, building elevated structures on waterfront property, creating venues and attractions as a way of boosting the local economy, and utilizing smart growth principles to rebuild and regrow Delcambre and other area communities.

"The ideas," Verret says, "were for how we could retain a working waterfront, yet attract a different economy to the region. In other words, the docks would remain functional for the fishing community, as well as accommodate commercial, retail, recreational, and tourism enterprises."

He adds, "At that point we started realizing that the economy of our little town needed to take a different direction. That's where the discussion started."

MORE PLANNING

Not long after the charrettes, the port began looking for a project to help the community. It was out of casual conversations with port staff members that Hymel was able to connect community members with Sea Grant and other resources.

"This was really a result of having long-term relationships," Hymel says. "I'd been a marine extension agent for 30 years and knew all these people."

With the aid of Sea Grant facilitation and hazard mitigation expertise from Rod Emmer, who is now deceased, the port and town appointed a steering committee to plan for, oversee, and carry out the recovery of the community and seek out funding.

In addition to Sea Grant, the steering committee sought out the help of the Louisiana State University School of Landscape Architecture, University of Louisiana Community Design Workshop, University of Louisiana School of Business Administration, and others. Through more charrettes and planning sessions, a redevelopment plan was developed in 2006 and updated in 2010.

"This was not a group of elected politicians," Hymel emphasizes. "These were guys who'd never gotten together to do this before. They wanted to think through the recovery so when money came, they'd be ready. All of these ideas came from the community's desire to reinvent itself."

"When this vision of what could happen caught hold of us, it wouldn't let go," Verret says.

PAYING OFF

Despite setbacks from Ike and the Deepwater Horizon oil spill, the planning efforts are paying off.

"Delcambre used the conceptual plans they developed when they were shopping around for redevelopment grants," Kron says. "They were essentially the only community that went forward in Southern Louisiana that had something on paper that you could visualize. It made a huge difference in them receiving grants."

The first grant was $2 million to begin developing a state-of-the-art facility where fishermen could directly market their product to the public. "It's like a farmer's market for seafood," Hymel says.

After receiving additional grants, the $3.2 million facility, which also has a recreational boat launch and a pavilion that can be used for community festivals and other public uses, opened in September to large crowds.

For the first time, the community also voted to pass a property tax (millage) that the port has used in part to turn little-used public docks into a marina that is attracting high-end vessels. Special packaging and a direct marketing campaign for Vermilion Bay Sweet shrimp have also been developed, and are being expanded to locally caught fish.

To get fishermen on board with direct marketing, educational programs—or seafood academies—were developed by Sea Grant and have been picked up by the Louisiana Department of Wildlife and Fisheries for other parts of the state.

Plans are underway for the development of waterfront residences, mixed-use business areas, and a long-awaited new grocery store.

"Delcambre's getting a new life," Hymel says.

Continued on page 11

Photos courtesy of Louisiana Sea Grant

Massachusetts Ocean Plan Gets High Marks Following First Approved Project

With the first project approved under the Massachusetts Ocean Management Plan nearly complete, a nonprofit posed the question, "How are things different with an ocean plan in place?" Replies from case study respondents were almost universally positive, and their feedback can benefit coastal resource managers in other states looking to fine-tune their own ocean-planning efforts.

"We were very pleased that respondents felt the plan worked in the ways it was designed to work," says Bruce Carlisle, director of the Massachusetts Office of Coastal Zone Management, which led the collaborative planning effort aimed at balancing stewardship of a state's ocean waters and resources with sustainable ocean uses.

Approved in 2013, the inaugural project combines electrical and fiber-optic technology into a single, underwater cable running 4.6 miles across Vineyard Sound, a move that will improve service reliability for thousands of Martha's Vineyard residents.

In the case study conducted by SeaPlan, a nonprofit ocean science and policy group, project participants praised the ocean plan for its predictability, efficiency, and success at protecting the environment. The planning process lessened project costs as well as review and permitting time.

Praise for the plan also has come from a regional business association, which honored the combined team of commercial and regulatory project partners for their outstanding collaboration.

OCEAN CROWD CONTROL

The seeds of the Massachusetts ocean plan were sown with the Oceans Act of 2008, signed into law by Governor Deval Patrick. This act targeted an emerging issue in this state and many others: a surge of interest in ocean-based projects. The increased pressures on ocean resources led many to call for more careful ocean planning and a more efficient permitting process that would protect existing ocean uses and resources while supporting newer, sustainable uses.

> ***"We were very pleased that the respondents felt the plan worked in the ways it was designed to work."***
>
> ***Bruce Carlisle,***
> *Massachusetts Office of Coastal Zone Management*

Massachusetts' 1,500-mile coastline and state ocean waters support abundant marine life as well as economic sectors that range from tourism and outdoor recreation to fisheries, shipping, and scientific research. Newer ocean-use sectors include aquaculture, liquefied natural gas infrastructure, and the extraction of ocean sand for beach renourishment.

"In developing the ocean plan, one of our first goals was to streamline permitting, reducing uncertainty," says Carlisle. To that end, the ocean regulatory partners avoided setting up a new process, opting instead for well-known state regulatory standards as the entry point for project applicants.

With input from scientists, experts, and other stakeholders, state resource and regulatory agencies also reached consensus on the best baseline data sets that showed sensitive species and habitat, existing uses, or other areas to be avoided. These data sets were placed on the interactive Massachusetts Ocean Resource Information System (MORIS) site.

In December 2009, the Massachusetts Ocean Management Plan was released.

CASE STUDY

Following approval of the cable project, SeaPlan interviewed many who had taken part in the review, consultation, or permitting process.

The respondents represented Epsilon, Inc., an environmental permitting consultant to the cable concerns Comcast and NStar Electric; the U.S. Army Corps of Engineers; NOAA National Marine Fisheries Service; Martha's

Using an underwater video sled, cable proponents collected additional seafloor and habitat data.

Vineyard Commission; and Massachusetts Department of Environmental Protection, Division of Marine Fisheries, and Office of Coastal Zone Management.

"Both commercial and regulatory participants in our case study said that the baseline data, clear performance standards, and siting guidance made the process more predictable and efficient, with better environmental outcomes," says Stephanie Moura, SeaPlan's managing partner.

"The proponents were able to take some undersea routes off the table early on and focus on a route more likely to be approved by regulators," she adds.

SAVING TIME AND MONEY

A pre-application meeting in 2011 also received good marks from respondents.

"It was so helpful to meet face to face with staff members from all the relevant regulatory agencies," says Holly Carlson, a senior scientist at Epsilon Associates. "We discussed the MORIS baseline data and paths to avoid, plus we explained our methodology for collecting more detailed data that would help confirm the best route."

The ocean plan states a preference for new undersea infrastructure that is "bundled" into common pathways whenever possible. Epsilon Associates worked with Comcast and NStar on a plan to combine both electricity and fiber-optic technology into a more efficient, single submarine cable.

Not only was their plan approved, but ultimately it reduced Comcast's and NStar's costs. In addition, NStar saved an estimated 18 months in review and permitting time.

Some case study respondents noted that the preplanning process did take more agency coordination time up front. However, that initial time investment allowed for more efficient and predictable permitting and post-permitting processes.

For example, regulators and project proponents needed fewer consultations during the permitting and regional commission review stages, because so many details had been ironed out in advance.

BUSINESS KUDOS

In 2013 the cable project's commercial and regulatory partners were awarded the Nicholas Humber Environmental–Energy Award for Outstanding Collaboration by the Environmental Business Council of New England.

This honor, and the positive results of the case study, may help resource managers in other states who are seeking similar ocean plan success.

According to Moura, case study respondents especially liked the fact that the ocean plan developers didn't allow the perfect to be the enemy of the good.

"They didn't invent a whole new management system but started with regulatory structures already in place. They gave people data and information up front. They checked in at key points in the review and permitting process. And they update and improve the framework along the way," emphasizes Moura. "As more data are incorporated into MORIS and people get more familiar with the ocean plan, the benefits will keep adding up." ❖

An article on the case study method appears on page 46 of ECO magazine at http://digital.eco-tsc.com/publication/?i=205327.
To learn more about the Massachusetts Ocean Management Plan, visit www.mass.gov/eea/mop.
You may also contact Bruce Carlisle at (617) 626-1205 or Bruce.Carlisle@state.ma.us.

Photos courtesy of Epsilon Associates

West Maui Initiative Connects the Dots between Everyday Actions and Coral Reef Health

"We focus on changes people can make in their own backyards to cut water-based pollution that threatens reefs."

Tova Callender,
West Maui Kumuwai

In Hawaii where runoff and other threats are damaging coral reefs off Maui's western coast, a social marketing campaign has convinced many islanders to make choices that can shore up reef health. The campaign's innovative approach may benefit other coastal professionals dealing with similar reef concerns.

"People here are proud of Maui's specialness, but many didn't realize that they live in the watershed, and what happens in the watershed affects the ocean," says Tova Callender, watershed and coastal management coordinator of the West Maui Ridge to Reef Initiative (R2R), which is a campaign partner.

"We focus on changes people can make in their own backyards to cut water-based pollution that threatens reefs," adds Callender.

The West Maui Kumuwai corals campaign has garnered widespread community support via popular planting events to stem erosion, online "protect our reef" testimonials, multimedia stories, and individual and business pledges to use or promote "ocean-friendly" landscaping and fertilizer products.

And it's not over. Local supporters have stepped up to keep the campaign going, aiming to make bigger gains over time in community coral-health awareness and ocean-friendly choices.

CORAL THREATS

Healthy coral reefs play a major role in Hawaii's rich cultural heritage and nature-based recreational and commercial activities, such as fishing and tourism. What's more, 25 percent of the marine species on Hawaii's coral reefs are found nowhere else in the world. In a 2011 NOAA-commissioned study, U.S. citizens estimated the value of Hawaii's coral reefs at more than $33 billion.

But off the shores of Maui, an island where the watershed flows from the mountains to the sea, decades of rapid development, erosion, and agricultural and urban runoff have contributed to severe reef stress. Data from four West Maui reef sites show a 37 percent decline in total coral cover between 1995 and 2012.

Too much soil in ocean waters can smother corals, and excess nitrogen and phosphorus from fertilizers or pesticides spur algal growth that blocks sunlight, harming coral growth and health and affecting marine creatures that rely upon reefs.

The Hawaii Coral Reef Strategy and U.S. Coral Reef Task Force have made the West Maui reefs a major focus of current research and management efforts.

"Our campaign aimed to supply a missing piece of the puzzle—raising the community's awareness about making choices to protect reef health," says Callender.

Campaign support was made possible by a cooperative agreement between the NOAA Coral Reef Conservation Program and SeaWeb Asia Pacific. SeaWeb served as a social marketing advisor and facilitator, provided market research services, and helped implement the campaign.

Juvenile parrot fish off the West Maui shore need the shelter that healthy coral reefs provide.

Photo by Liz Foote and courtesy of Coral Reef Alliance

In addition to R2R, the campaign team includes the Coral Reef Alliance, Hawaiian Islands Humpback Whale National Marine Sanctuary, Makai Watch, Maui Nui Marine Resource Council, Alakaina Foundation, and Save Honolua Coalition.

BUILDING ALLIANCES

"Every social marketing campaign needs to define the 'ask'—what are you asking people to do?" explains Callender. "This was a challenge, because the reasons for coral reef damage are complex, and there's not just one behavior change that will fix things."

Eventually the group settled on eight major "asks" summarized in catchy phrases such as "Pick Up After My Pooch," "Handle Pesky Pests Right," "Install a Rain Garden," and "Car Wash Like a Greenie."

Next, they sought out the groups and people most likely to become early allies. These included a nonprofit that helps protect a West Maui bay from overdevelopment and local figures who stem erosion and runoff by planting community and rain gardens.

Many allies made written or photographed pledges, and some shared their commitment to ocean health on the website's Real People, Real Stories section, which became West Maui Kumuwai's most popular online feature after the home page.

Next targeted were local landscapers, and four businesses have made "Ocean-Friendly Landscaper" pledges to use products and practices least harmful to ocean health. Pledgers are given stickers, buttons, and other opportunities to promote their ocean-friendly commitment.

More than 50 campaign volunteers planted 1,000 native plants that will stabilize a bare slope and reduce runoff.

Several hardware stores and other retailers agreed to tag recommended fertilizers and pesticides with "Ocean Preferred" stickers. In training sessions, employees learned about the issue plus strategies for directing customers to these products. Many employees proudly wear the campaign T-shirts and stickers.

KEEPING ON

"It has been such a pleasant surprise to see how the community has welcomed this campaign. We've seen a real shift in awareness and engagement," says Callender.

At last count, "Ocean-Friendly Landscaper" pledges covered more than 200 residential and commercial acres on Maui. Four retailers have joined the "Ocean Preferred" product initiative, putting stickers on more than 2,000 yard care products. Two additional retailers have asked to join. Coverage on radio shows and in newspapers has reached well over 30,000 people.

And in December 2013, *The Maui News* honored the West Maui Kumuwai campaign as one of its five annual "People Who Make a Difference" recipients.

"The campaign is not over—in fact, we're still building up the social marketing campaign and are working to increase our partnerships with landscapers and retailers," says Callender.

The original funding is finished, but local partners have stepped up to provide additional funding support. "We aim to keep making a bigger impact on community awareness and actions over the next few years, following up with pledgers, and evaluating our results over the long term." ❖

To learn more about the West Maui Kumuwai corals campaign, visit www.westmauikumuwai.org. You may also contact Tova Callender at (808) 214-4239 or tovacallender@gmail.com.

Photo by Ananda Stone and courtesy of West Maui Kumuwai

Smart Devices are Helping Create Estuarine-Smart Kids in Florida

"The devices get used over and over again, so the initial investment is well worth it."

Kenneth Rainer,
Guana Tolomato Matanzas Research Reserve

Normally, teachers tell students to put their cellphones and tablets away before starting a lesson, but these kinds of electronic devices are a critical part of education programs at a Florida national estuarine research reserve.

"Students already know how to use this technology, and we're demonstrating its relevance to field research," says Kenneth Rainer, education coordinator for the Guana Tolomato Matanzas (GTM) Research Reserve in Ponte Vedra Beach. "The reserve's goal is to keep students engaged and stimulate their interests in field research and the estuary, thereby creating estuarine-literate students, which will ultimately result in resilient communities."

The handheld electronic devices are a key component of the reserve's K-12 Estuarine Education Program (KEEP). All 28 research reserves in 22 states and Puerto Rico participate in this reserve system program, where the education coordinators deliver informative, interactive, and fun educational programs to students.

Combining digital literacy with field experience is a significant part of implementing KEEP at the GTM Reserve. In many instances, the program pairs iPads with the same high-tech environmental sampling equipment used by the reserve researchers. This pairing, Rainer says, provides a "powerful educational experience."

Programs that incorporate the smart devices have been developed for fourth graders, middle school students, and high school students. "We want to make sure students know they can make a difference, no matter what their age," Rainer says.

For instance, middle to high school students can go to the estuary and collect environmental and water quality data, which they document with a tablet. The student information is then uploaded to a web-based database that the teacher can access back in the classroom.

In another program, students can create short video journals on their smart devices. Each participant has a 30-second goal to describe what they are doing in the field, defining the problem, stating observations, forming hypotheses, describing methods used, and recording conclusions.

Rainer was able to get three grants to purchase smart devices for student use and is seeking funding to purchase more.

"The devices get used over and over again, so the initial investment is well worth it," he says. "One of the lessons we learned is that you can't have 45 students around one smart device. My ultimate goal is to have one device for every five students."

After two years, Rainer says there is enough student-collected data to create graphs and see data changes. He's proud of the fact that the data collected by the students track well with the data collected by reserve researchers. The education program numbers have also increased "dramatically."

"Through this process, students recognize that they, too, can contribute significantly to research and science through data field explorations," Rainer says. "I'm very passionate about this." ❖

For more information on the Guana Tolomato Matanzas Research Reserve education programs, go to http://gtmnerr.org/Education.php. You may also contact Kenneth Rainer at (904) 823-4500 or Kenneth.Rainer@dep.state.fl.us. For more information on the reserve system's K-12 Estuarine Education Program go to http://nerrs.noaa.gov/Doc/PDF/Background/KEEPOnePager.pdf.

Photos courtesy of Guana Tolomato Matanzas National Estuarine Research Reserve

Continued from page 5

HELPING OTHERS

To help communities recovering from Sandy, Louisiana Sea Grant recently shared its lessons from the rebuilding process with New Jersey, New York, and Connecticut Sea Grant program staff members. Delcambre was one of the success stories they highlighted.

What was their advice?

"Patience," says Verret, who was among those who spoke with the Sea Grant staff. "You need community planning. You can't be dissuaded by obstacles or the magnitude of the disaster. You have to put forth a pie-in-the-sky vision and take one step at a time."

He adds, "We don't have all the answers. We're still learning as we go and still have challenges ahead. But our success and what we've done I think is creating a model for other communities. Anyone who wants to listen, we'll talk." ❖

For more information on Delcambre's recovery, go to www.laseagrant.org/2014/hurricane-sandy-survivors. You may also contact Don Davis at (225) 578-3481 or don.lsu.davis@gmail.com, Thomas Hymel at (337) 276-5527 or thymel@agcenter.lsu.edu, or Roy Kron at (225) 578-6564 or rkron@lsu.edu. In addition, Wendell Verret is available at (800) 884-6120, ext. 1, or wverret@portofdelcambre.com. For more information on the direct marketing campaign, go to http://louisianadirectseafood.com/announcements/the-vermilion-bay-sweet-story.

NEWS YOU CAN USE

FROM THE NOAA COASTAL SERVICES CENTER

Online Atlas Documents Coastal Land Cover Changes over Time

See how your county is changing to fine-tune resilience plans.

A new NOAA nationwide analysis shows that between 1996 and 2011, 64,975 square miles in ocean and Great Lakes counties—an area larger than the state of Wisconsin—experienced changes in land cover.

These and other land cover changes can be seen on NOAA's Land Cover Atlas at *www.csc.noaa.gov/digitalcoast/tools/lca*. Changes include forest or wetland losses that may make an area's flooding and water quality issues worse or weaken the fishing and forestry industries.

"Seeing changes over five, 10, or even 15 years allows Land Cover Atlas users to focus on local hazard vulnerabilities and improve their resilience plans," says Jeffrey L. Payne, Ph.D., acting director for NOAA's Coastal Services Center.

"For instance, the atlas has helped its users assess sea level rise hazards in Florida's Miami-Dade County, high-risk areas for stormwater runoff in southern California, and the best habitat restoration sites in two watersheds of the Great Lakes."

NATIONAL FINDINGS – 1996 TO 2011

- 1,536 square miles of wetlands were lost. Wetland losses to development equaled 642 square miles, a rate averaging 61 football fields daily.
- Total forest cover declined by 6.1 percent, and forest changes totaled 27,515 square miles, equaling West Virginia, Rhode Island, and Delaware combined. This total impact, however, was partially offset by reforestation growth.

REGIONAL FINDINGS – 1996 TO 2011

- The Northeast region added more than 1,170 square miles of development, an area larger than Boston, New York City, Philadelphia, Baltimore, and the District of Columbia combined.
- The West Coast region experienced a net loss of 3,200 square miles of forest (4,900 square miles of forests were cut while 1,700 square miles were regrown).
- The Great Lakes was the only region to experience a net wetlands gain (69 square miles), chiefly because drought and lower lake levels changed water features into marsh or sandy beach.
- The Southeast region lost 510 square miles of wetlands, with more than half this number replaced by development.
- Many factors led to the Gulf Coast region's loss of 996 square miles of wetlands, including land subsidence and erosion, storms, man-made changes, and sea level rise.

On a positive note, local restoration activities, such as those in Florida's Everglades, and lake-level changes enabled some Gulf Coast and Southeast communities to gain modest-sized wetland areas, although such gains did not make up for the larger regional wetland losses. ❖

To learn more about the atlas and time-series data sets developed by NOAA's Coastal Change Analysis Program, view www.csc.noaa.gov/ccapftp or contact Nate.Herold@noaa.gov.

END NOTE

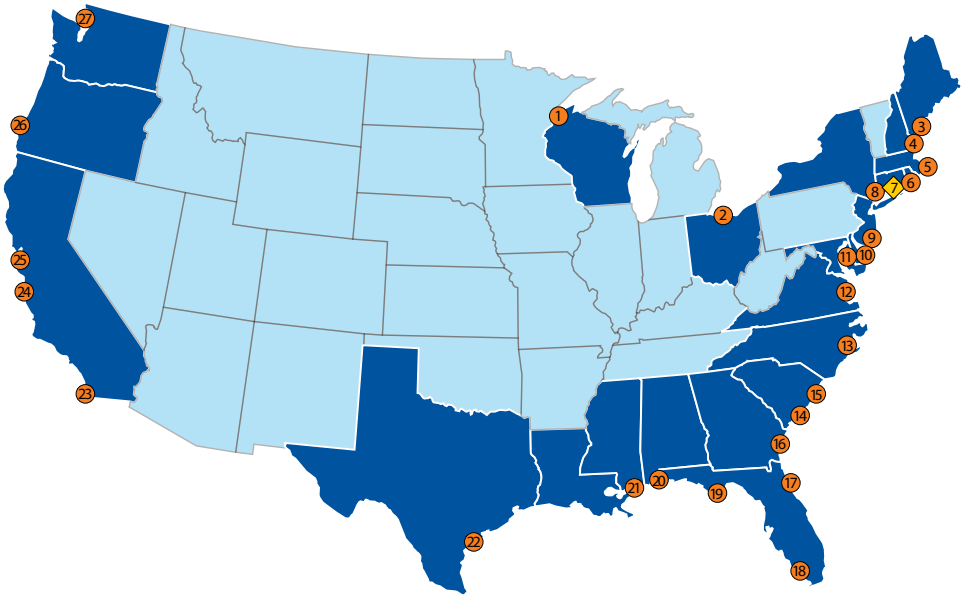
National Estuarine Research Reserves

Where Science and Policy Meet.

The National Estuarine Research Reserves protect over 1.3 million acres of coastal habitat, providing tremendous benefit to coastal communities. These benefits include

- local research and monitoring data for key coastal issues;
- training and tools for coastal decision makers;
- educational programs for K-12 teachers and students; and
- protected natural areas that safeguard coastal communities

It's a great time to discover the research reserve nearest you. Learn more at *www.nerrs.noaa.gov.*



LIST OF RESERVES

Great Lakes
1. Lake Superior, Wisconsin
2. Old Woman Creek, Ohio

Northeast
3. Wells, Maine
4. Great Bay, New Hampshire
5. Waquoit Bay, Massachusetts
6. Narragansett Bay, Rhode Island
7. Connecticut (*Proposed*)

Mid-Atlantic
8. Hudson River, New York
9. Jacques Cousteau, New Jersey
10. Delaware
11. Chesapeake Bay, Maryland
12. Chesapeake Bay, Virginia

Southeast
13. North Carolina
14. ACE Basin, South Carolina
15. North Inlet-Winyah Bay, South Carolina
16. Sapelo Island, Georgia
17. Guana Tolomato Matanzas, Florida

Gulf of Mexico
18. Rookery Bay, Florida
19. Apalachicola, Florida
20. Weeks Bay, Alabama
21. Grand Bay, Mississippi
22. Mission-Aransas, Texas

West
23. Tijuana River, California
24. Elkhorn Slough, California
25. San Francisco Bay, California
26. South Slough, Oregon
27. Padilla Bay, Washington
28. Kachemak Bay, Alaska

Caribbean
29. Jobos Bay, Puerto Rico

Pacific
30. Hawaii (*Proposed*)

Office for Coastal Management
National Estuarine Research Reserves

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NEW DATA.
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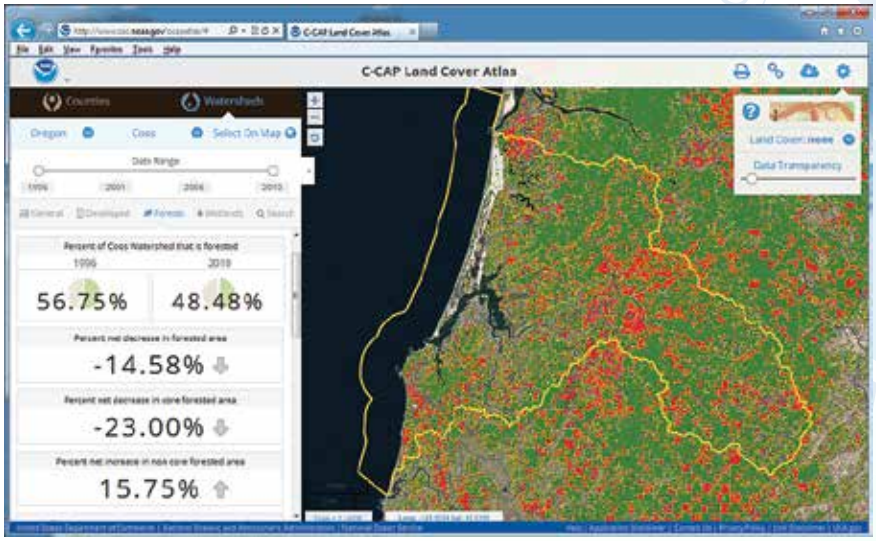
The same great Land Cover Atlas.



The tool that provides land cover data for the coastal U.S. was recently updated with 2010 information. Users can now view land cover change back to 1996—by county or by watershed.

C-CAP Land Cover Atlas
www.csc.noaa.gov/digitalcoast/tools/lca